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(54) Abstract Title
Extraction of active substance from cabbage

(57) A method for the preparation of an active plant substance comprises peeling and washing cabbage (Brassica oleracea var. capitata L.), cutting it, cooling and freezing slices, defrosting the resulting material, refreezing, vacuum freeze drying, disintegration of the resulting material, extracting with water, separating the liquid part from insoluble fractions and vacuum freeze drying of the liquid part. Preferably, all the steps are carried out below 4 °C and the cooling and freezing slices step takes place at -27 to -40 °C for 12-36 hours. The active substance may be used for the prophylaxis and treatment of gastrointestinal distress and may be administered as a pharmaceutical composition or in a foodstuff, such as a confection. The substance may also be used to stimulate microbiological processes. The method provides a concentrated form of an unstable component, different from vitamin U, which provides the therapeutic activity of cabbage juice.

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Active Plant Substance and Process for Manufacture thereof

The present invention relates to processes for manufacture of active substance from plants, particularly, from Brassica oleracea var. capitata L. (further named cabbage), for prophylaxis and treatment of gastrointestinal distress and some other pathologic conditions. The active plant substance mentioned above may also be used as the food supplement, and for the stimulation of some microbiological processes as well.

Since 1949, when G. Cheney published material about the successful using of cabbage juice for the treatment of ulcer, the cabbage juice have been known as scientific recipe for the treatment of gastrointestinal distress. Nevertheless, all attempts to use cabbage juice in everyday practice failed due to low stability of the cabbage juice. Vitamin U, which was known as an active component of the juice, did not show proper activity either.

The method has been known for isolating an anty-mutagenic factor from cabbage juice, which comprises the steps of: centrifuging cabbage juice to remove particles of tissue, ultracentrifuging the resulting supernatant, contacting the resulting supernatant with an anion exchange cellulose, applying the passed fraction to a column of a cation exchange celulose, eluting the absorbed substances with an aqueous eluant containing KCl or NaCl in a gradient concentration, separating from the eluate the fraction containing the said anti-mutagenic factor which is eluted at a lower concentration of KCl or NaCl, applying the said factor onto a molecular sieve, and recovering the said factor therefrom (U.S. Patent 4,191,752)

We have found that therapeutic activity of cabbage juice in general depends on the unstable factor different from vitamin U, and that the said factor may be concentrated in a stable form.

It is, therefore, an object of the present invention to provide a method for activating and concentrating into stable form the said factor from cabbage.

According to the present invention, the said active plant substance is prepared by the steps of:

(a) peeling and washing cabbage (Brassica oleracea var. capitata L.) with water,

(b) cutting it,

(c) cooling and freezing slices,

(d) defrosting the resulting material,

(e) refreezing the resulting material,

(f) vacuum freeze drying,

(g) disintegration of the resulting material,

(h) extracting the resulting material with water,

(i) separating the liquid part from insoluble fractions,

(j) vacuum freeze drying of the liquid part.

Peeling and washing cabbage with water allow to avoid the contamination of the further substance. During slow cooling and freezing, the cell structures are disintegrated and the active substance has been separated. This process has been carried out much more effective if the material is defrosted as fast as possible and refreezed slowly. At any moment the temperature inside specimen must not be higher then +4°C, because this is a critical point of the substance stability. Disintegrating the resulting material after defrosting by a mechanical disintegrator is not effective enough, and an ultrasound disintegrator affects the active substance negatively. Dried material may be disintegrated much more effectively. Solubility of the active factor with water is high enough to use the ratio of 2 liters of water per kilogram of the powder, but it is possible to carry out the process by ratio of 0.5 to 7 liters of water per kilogram of the powder. Separating the liquid part from insoluble fractions (i) is carried out according to the membrane separation technology, and by passing the slurry through a centrifuge and an ultracentrifuge. Particles of tissue, including microsomes and ribosomes, must be removed, by one or another way, from supernatant.

Dried supernatant (j), including the said active factor may be used separately or in composition as a food supplement and as a medicine. In order to prepare such compositions other active ingredients, microorganisms, and pharmaceutically acceptable carriers or excipients may be used. The formula may be administrated orally in any (solid, like powder or tablets, or liquid) form, and in the form of a confection, too.

The following example will further illustrate the present invention.

EXAMPLE

5,000 g of cabbage was washed with water, cut into slices of 1 cm, and treated in a camera so that during the first 3 hours the temperature into the camera was about -1°C, then every hour the said temperature was dropped by 1.5°C. In 27 hours refrigerating was switched off and the material was incubating up to the said temperature reached -1°C. Then, the process of freezing was repeated, and the material was lyophilized. The resulting material was disintegrated. 200 g of the resulting powder has been extracted by contacting the powder with 0.5 liter of water. The material was centrifuged at 9000 G at 4°C for 30 minutes. The supernatant was further ultracentrifuged at 2×10^5 G at 4°C for 4 hours. Resulting supernatant was freeze-dried. To each 5 g of the resulting powder was added 50 mg vitamin B_6, and 1 g l-alanine. Composition was packed under vacuum.

Claims

1. A method for the preparation of an active plant substance, which comprises the steps of:

(a) peeling and washing cabbage (Brassica oleracea var. capitata L.) with water,

(b) cutting it,

(c) cooling and freezing slices,

(d) defrosting the resulting material,

(e) refreezing the resulting material,

(f) vacuum freeze drying,

(g) disintegration of the resulting material,

(h) extracting the resulting material with water,

(i) separating the liquid part from insoluble fractions,

(j) vacuum freeze drying of the liquid part.

2. The method according to claim 1, wherein the cooling and freezing slices over a period of from about 12 hours to about 36 hours up to temperatures between -27° to -40°C.

3. The method according to claim 1, wherein the resulting powder from step (g) has been extracted by contacting the powder with water at ratio of 0.5 to 7 liters of water per kilogram of the powder.

4. The method according to claim 1, wherein the separating the liquid part from insoluble fractions (i) is carried out according to membrane separation technology.

5. The method according to claim 1, wherein the separating the liquid part from insoluble fractions (i) is carried out by passing the slurry through a centrifuge and ultracentrifuge.

6. The method according to claim 1, wherein all procedures are carried out at a temperature below about 4°C.

7. The method according to claim 1, wherein the active plant substance is in a pharmaceutical composition.

8. The method according to claim 1, wherein the active plant substance is in a feed.

9. The composition according to claim 7 or claim 8, further comprising effective amount of a biologically active ingredient or composition of some biologically active ingredients.

10. The composition according to claim 9, wherein a biologically active ingredient is a member selected from the group consisting of Lactobacilus.

11. The composition according to claim 9, wherein a biologically active ingredient or one of the biologically active ingredients is a member selected from the group consisting of vitamins and trace elements.

12. The composition according to claim 9, wherein a biologically active ingredient or one of the biologically active ingredients is a member selected from the group consisting of aminoacids.

13. The formula of claim 1 or claim 9, wherein the said composition is in the form of a powder.

14. The formula of claim 1 or claim 9, wherein the said composition is in the form of a tablet.

15. The formula of claim 1 or claim 9, wherein the said composition is in the form of a liquid.

16. The formula of claim 1 or claim 9, wherein the said composition is in the form of a paste.

17. The formula of claim 1 or claim 9, wherein the said composition is in the form of a solid.

18. The formula of claim 1 or claim 9, wherein the said composition is administrated with a pharmaceutically acceptable carrier or excipient.

19. The formula of claim 1 or claim 9 wherein the said composition is administrated orally in the form of a confection.

INVESTOR IN PEOPLE

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Claims searched: 1-19

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Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): A5B

Int Cl (Ed.7): A61K; C07G

Other: Online: BIOSIS, CAS-ONLINE, EPODOC, MEDLINE, PAJ, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	EP 0732103 A3	(WEIS) see example and WPI abstract AN 1996-278488 [42]	1-19
Y	US 3108040	(FOLKERS) see whole document, especially col 2, lines 71-72 and col 3, lines 5-22	1-19

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.